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EXAMINER	
SAVANI, AVINASH A	
ART UNIT	**PAPER NUMBER**
3749	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,119	PRADE, BERND	
	Examiner	Art Unit	
	AVINASH SAVANI	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-29 and 31-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *16-29 and 31-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. The following action is in response to the applicant's Amendment dated 10/7/2010, that was in response to the Office action dated 7/7/2010. Claims 16-29 and 31-35 are pending, claims 16, 19, 24, 31, 33 and 34 have been amended, while claim 30 has been cancelled by way of the amendment date 10/7/2010.

Response to Arguments

2. Applicant's arguments with respect to claims 16-29 and 31-35 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 31 is objected to because of the following informalities: Claim 30 is dependent on cancelled claim 30. Appropriate correction is required. Keeping with the pattern of dependency, claim 31 will assumed to be dependent on claim 29.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 16-29, and 31-35 rejected under 35 U.S.C. 103(a) as being unpatentable over McCarty et al [6015285], further in view of Pfefferle et al [6048194].

7. With respect to claim 16, McCarty discloses a method of combusting a fuel in a catalytic combustion system, comprising: providing a catalytic burner comprising providing a catalytic burner comprising a first catalytic element (10) disposed in a first flow path, the first flow path in fluid communication with and disposed upstream with respect to a direction of flow within a primary burner, the primary burner comprising a flow channel [see FIG 1, col 6, line 41-50]; reacting fuel supplied by the catalytic burner fuel supply in a catalytic pre-reaction by exposing the fuel and the air flow to the catalytic element [col 5, line 31-col 6, line 37]; and continuing to burn the pre-reacted fuel in a secondary reaction located in the primary burner located downstream of the pre-reaction [col 9, line 54-col 10, line 61], however does not disclose the swirling component as further claimed. Pfefferle teaches a similar method directing the pre-reacted fuel from the first flow path into burner the flow channel at a location radially offset from and at an angle of 15° to 75° relative to a flow channel longitudinal axis, the wherein the angle-flow channel outer wall is effective to impart a circumferential motion to the pre-reacted fuel in the flow channel, causing the pre-reacted fuel to flow in a helical flow path in the flow channel [see FIG 2, col 3, line 46-53, line 59-67, col 4, line 1-10, line 44-65]. In view of Pfefferle, a swirler directs pre-reacted fuel at an angle in the range claimed based on the formulation of the swirl number and tangential velocities. It

would have been obvious to a person of ordinary skill in the art at the time of the invention to provide a swirling component because the technique was known in the art, yielding the predictable result of lowering NOx emissions by lowering burner temperature.

8. With respect to claim 17, McCarty discloses the method as claimed in claim 16, wherein the pre-reacted fuel flow is directed into a combustion space [col 5, line 31-40], however does not disclose the creation of the vortex. Pfefferle teaches a similar device where a vortex is created, and the secondary reaction occurs in the vortex [see FIG 2, col 3, line 46-53, line 59-67, col 4, line 1-10, line 44-65]. In view of Pfefferle, the secondary reaction occurs in the vortex. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide a swirling component because the technique was known in the art, yielding the predictable result of lowering NOx emissions by lowering burner temperature.

9. With respect to claim 18, McCarty discloses the method as claimed in claim 17, however does not disclose the length of the burner depending on the dwell time of the pre-reacted fuel. Pfefferle teaches a similar device wherein the combined length of the catalytic burner, primary burner and combustion space are determined based on a dwell time of the pre-reacted fuel [col 1, line 35-40]. In view of Pfefferle, the identification of the problem of a short channel limiting catalyst residence time shows the awareness of having the length of the burner depend on the dwell time. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the combined length of the device based on the dwell time of the pre-reacted fuel because it was

known that the length of has an effect on the residence time of the catalyst reaction, therein showing that varying the length varies the catalyst reaction.

10. With respect to claim 19, McCarty discloses the method as claimed in claim 18, wherein the catalytic burner, primary burner and combustion space are arranged next to each other in sequence along a path of the air flow [see FIG 1].

11. With respect to claim 20, McCarty discloses the method as claimed in claim 19, however does not disclose the secondary reaction as further claimed. Pfefferle teaches a similar method wherein the secondary reaction is a homogeneous non-catalytic reaction [see abstract]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have a secondary reaction as claimed because the technique was known in the art, yielding the predictable result of limiting NOx formation.

12. With respect to claim 21, McCarty discloses the method as claimed in claim 20, wherein the fuel is completely burned in the secondary reaction [col 9, line 54-col 10, line 61].

13. With respect to claim 22, McCarty discloses the method as claimed in claim 21, wherein the dual gas/liquid fuel is either a fuel gas or a fuel oil [col 10, line 47-61]. The use of methane suggests a fuel gas.

14. With respect to claim 23, McCarty discloses the method as claimed in claim 22, wherein the fuel is a fuel gas during a first operating mode of the catalytic combustion system [col 8, line 48-53], however does not disclose the second operation mode as claimed. This, however is believed to be well known in the art to have different operation modes that with respective fuels, therefore it would have been obvious to a person of

ordinary skill the art to have a second operating mode wherein a fuel is a fuel oil during a second operating mode catalytic combustion system because this feature offers versatility which is a common goal through innovation.

15. With respect to claim 24, McCarty discloses a bumer for burning a dual gas/liquid fuel, comprising: a primary burner comprising a primary channel, wherein the primary flow channel comprises a primary flow channel outlet [see FIG 1]; and a catalytic burner comprising a catalytically effective element (10) disposed in a catalytic burner flow channel, wherein the fuel is catalytically reacted via exposure to the catalytically effective element [see FIG 1, col 5, line 31-col 6, line 50], however does not disclose a burner creating a vortex. Pfefferle teaches a similar device having burner fuel outlet disposed at a location radially offset from a primary flow channel longitudinal axis and at an angle between 15° to 75° relative to the primary flow channel longitudinal axis, a in the channel, wherein a primary flow channel outer wall imparts circumferential motion to the pre-reacted fuel effective to create a vortex in the primary flow channel, wherein the [see FIG 2, col 3, line 46-53, line 59-67, col 4, line 1-10, line 44-65]. In view of Pfefferle, a swirler directs pre-reacted fuel at an angle inherently in the range claimed based on the formulation of the swirl number and tangential velocities. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide a swirling component because the technique was known in the art, yielding the predictable result of lowering NOx emissions by lowering burner temperature.

16. With respect to claim 25, McCarty discloses the burner as claimed in claim 24, wherein the fuel is a fuel gas during a first operating mode of the catalytic burner [col 5,

line 5, line 31-col 6, line 37] however does not disclose the second operation mode as claimed. This, however is believed to be well known in the art to have different operation modes that with respective fuels, therefore it would have been obvious to a person of ordinary skill the art to have a second operating mode wherein a fuel is a fuel oil during a second operating mode catalytic combustion system because this feature offers versatility which is a common goal through innovation.

17. With respect to claim 26, McCarty discloses the burner as claimed in claim 25, wherein the catalytic burner comprises a plurality of flow channels, a catalytic burner fuel output for each flow channel, and at least one catalytically effective element per catalytic burner output [see FIG 1].

18. With respect to claim 27, McCarty discloses the burner as claimed in claim 26, wherein the catalytically effective element is a honeycomb catalytic converter [see FIG 2a].

19. With respect to claim 28, McCarty discloses the burner as claimed in claim 27, wherein the honeycomb catalytic converter basic component is selected from the group consisting of titanium dioxide, silicon oxide and zirconium oxide [col 7, line 66-67, col 8, line 32-40]

20. With respect to claim 29, McCarty discloses the burner as claimed in claim 28, wherein the honeycomb catalytic converter catalytically active component is a noble metal or metal oxide which has an oxidizing effect on the fluid fuel [see table 2]

21. With respect to claim 31, McCarty discloses the burner as claimed in claim 29, however does not disclose the perpendicular arrangement of the catalytically effective elements as further claimed.

22. With regard to claim 31, McCarty discloses the burner as claimed, however Pfefferle teaches a similar device wherein the catalytically effective elements are arranged in a plane perpendicular to the common longitudinal axis.direction of flow, effective element [see FIG 2, col 3, line 46-53, line 59-67, col 4, line 1-10, line 44-65]. In view of Pfefferle, a vortex is created and the fuel is discharged into the flow channel as claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide a vortex component because the technique was known in the art, yielding the predictable result of lowering NOx emissions by lowering burner temperature.

23. With respect to claim 32, McCarty discloses the method as claimed in claim 31, however does not disclose the length of the burner depending on the dwell time of the pre-reacted fuel. Pfefferle teaches a similar device wherein the combined length of the catalytic burner, primary burner and combustion space are determined based on a dwell time of the pre-reacted fuel [col 1, line 35-40]. In view of Pfefferle, the identification of the problem of a short channel limiting catalyst residence time shows the awareness of having the length of the burner depend on the dwell time. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the combined length of the device based on the dwell time of the pre-reacted fuel because it was

known that the length of has an effect on the residence time of the catalyst reaction, therein showing that varying the length varies the catalyst reaction.

24. With respect to claim 33, McCarty discloses he burner as claimed in claim 32, wherein the catalytic burner, primary burner and flow channel are arranged next to each other in sequence along a path of the air flow [see FIG 1].

25. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCarty et al ['285], in view of Pfefferle et al ['194], further in view of Hung [6339925].

26. With respect to claim 34, McCarty discloses combustion chamber for a dual gas turbine engine, comprising: a combustion chamber housing having an inward side mad an outward side; a combustion chamber wall formed on the inward side of the combustion chamber [see FIG 1] a plurality of heat resistant elements (10, 11) affixed to an interior of the combustion chamber wall that define a combustion air flow channel; a primary burner having a first annular flow channel comprising a first annular outlet and a second annular flow channel concentric with and surrounded by the first annular flow channel and comprising a second annular outlet, wherein the first and second annular flow channels comprise a common longitudinal axis [see FIG 1] a first catalytic burner comprising: a first catalytic burner flow channel; a first catalytically effective element (10) disposed in the first catalytic burner flow channel; and a first outlet arranged to direct a first flow into the first annular flow channel, a second catalytic burner comprising: a second catalytic burner flow channel; second catalytically effective element disposed in the second catalyic burner flow channel; and a second outlet

arranged to direct a second flow into the second annular flow channel, wherein subsequently a homogeneous non-catalytic secondary reaction is ignited downstream of the primary burner fuel outlet, however does not disclose the offset angles of the first and second fuel outlets [col 5, line 31-col 6, line 50, col 9, line 54-col 10, line 61]. Pfefferel teaches a similar device wherein the first fuel outlet disposed at a location radially offset and inclined at an angle between 15° and 75° relative to the common longitudinal axis a first annular flow channel outer wall effective to impart circumferential motion to the first flow and create a vortex in the first annular flow channel, wherein the the first fuel is catalytically pre-reacted by exposure to the first catalytically effective element; and the second outlet disposed at a location radially offset from and inclined at an angle between 15° and 75° relative to the common longitudinal axis, and a second annular flow channel outer wall effective to impart circumferential motion to the second flow and create a vortex in the second annular flow channel, wherein and the second fuel is catalytically pre-reacted by exposure to the second catalytically effective element [see FIG 2, col 3, line 46-53, line 59-67, col 4, line 1-10, line 44-65]. In view of Pfefferle, a swirler directs pre-reacted fuel at an angle inherently in the range claimed based on the formulation of the swirl number and tangential velocities. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide a swirling component because the technique was known in the art, yielding the predictable result of lowering NOx emissions by lowering burner temperature.

27. With respect to claim 35, McCarty discloses the combustion chamber as claimed in claim 34, wherein the fuel is either a fuel gas or a fuel oil [col 10, line 47-61]. The use of methane suggests a fuel gas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AVINASH SAVANI whose telephone number is (571)270-3762. The examiner can normally be reached on Monday- Friday, alternate Fridays off, 7:30-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven McAllister can be reached on 571-272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Avinash Savani/
Examiner, Art Unit 3749

/A. S./
12/1/2010

/Steven B. McAllister/

Supervisory Patent Examiner, Art Unit 3749